

## **REMARKS**

Claims 1-32 are pending in the present application. Claims 1-3, 5, 6, 14, 15, 17-19 and 21-23 have been amended and new claims 24-32 have been added. Reconsideration of the claims is respectfully requested.

A telephonic interview was conducted with Examiners Dung (Michael) T Nguyen and Paul Ip on December 4, 2003 to discuss and clarify claims 1, 14 and 17 on the subject of doped erbium oxide and ytterbium oxide over doped erbium ions and ytterbium ions and the low/high range end of ytterbium weight percentage.

### **I. 35 U.S.C. § 103 (Obviousness)**

Claims 1-2,4-5,7-14,16-18,20-21 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fernald et al (US622827) in view of King (US6208678). Claims 3,6,15,19 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fernald et al (US622827) in view of King (US6208678) and further in view of Snitzer (US4780877).

In ex parte examination of patent applications, the Patent Office bears the burden of establishing a prima facie case of obviousness. The initial burden of establishing a prima facie basis to deny patentability to a claimed invention is always upon the Patent Office. Only when a prima facie case of obviousness is established does the burden shift to the applicant to produce evidence of nonobviousness. If the Patent Office does not produce a prima facie case of unpatentability, then without more the applicant is entitled to grant of a patent.

A prima facie case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

As amended, independent claims 1 and 17 are limited to "a core formed from a similar phosphate glass host co-doped with 0.5-5.0 wt.%  $\text{Er}_2\text{O}_3$  and 0.5-30 wt. %  $\text{Yb}_2\text{O}_3$ ." Claim 14 has a similar limitation except the host is doped with 5-30 wt. %  $\text{Yb}_2\text{O}_3$  on account of the multi-mode pump. Applicant is claiming the unique combination of (a) phosphate glass host (b) co-doped with 0.5-5.0 wt.%  $\text{Er}_2\text{O}_3$  and 0.5-30 wt. %  $\text{Yb}_2\text{O}_3$  (5-30 % in claim 14) (c) in a cavity designed with a mode spacing that is sufficiently wide with respect to or larger than the wavelength-selective reflector's linewidth so that the erbium lases at a single longitudinal mode. This combination of elements is not taught nor suggested by the combination of Fernald in view of King or even further in view of Snitzer.

Fernald teaches a compression-tuned bragg grating and laser. By straining an optical element, Fernald is able to cause a shift in the reflection wavelength of the grating.

Fernald then goes on to recite an exhaustive list of glasses, fibers, shapes, laser configurations and dopants to which the compression-tuned bragg grating scheme may be applied. At col. 11, l. 13, Fernald does mention that his scheme could be used in conjunction with a laser doped with erbium and/or ytterbium. King is cited only to provide the source of pump radiation.

Fernald in view of King does not teach the unique combination of elements recited in amended claim 1 for a single longitudinal mode fiber laser and more specifically does not teach nor suggest co-doping with 0.5-5.0 wt.%  $\text{Er}_2\text{O}_3$  and 0.5-30 wt. %  $\text{Yb}_2\text{O}_3$ . In addition, Fernald's mere recitation at col. 4, line 5, that "the fiber 10 may be made of any glass, e.g., silica, phosphate glass or other glasses, or made of glass and plastic, or solely plastic" juxtaposed with his later recitation at col. 11, line 13 of erbium and/or ytterbium doping does not provide the motivation for co-doping the phosphate glass at the claimed elevated concentrations nor does it provide any reasonable expectation of success that doing so would produce a single longitudinal mode laser.

Snitzer clearly teaches an "Er only" laser. There is no teaching nor suggestion of co-doping the laser with any other dopant. In fact, claim 1 (col. 9, line 29) recites "a host material having incorporated therein a predetermined concentration of just erbium oxide..." As pointed out by the Examiner, Snitzer at col. 8, l. 15-16 does show an absorption spectrum for 2.5 weight percent  $\text{Er}_2\text{O}_3$  in silicate glass. The Er dopant concentration of an Er only laser cannot be properly combined with Fernald to support the Er concentrations in a laser co-doped with Er:Yb. Even if this combination is made, there is no

teaching in the cited references of the Yb dopant range nor the unique combination of elements cited in amended claims 1, 14 and 17.

Claim 17 as amended includes the further limitation that first and second wavelength-selective reflectors are formed on telecom fibers fusion spliced to either end of the doped phosphate glass fiber. Fernald teaches a grating on a glass tube that can be compressed to shift the wavelength of the grating. Applicant has discovered that placement of the reflectors on the telecom fibers reduces noise in the single longitudinal mode output signal.

In addition, claims 3, 19 and 29 claim a total co-doped concentration of at least 2.5 wt. % and claims 6, 15 and 22 claim a total co-doped concentration of at least 10 wt. %. These features are not taught in the cited references.

New independent claims 24 and 29 have been added. Claim 24 recites the features generally found in claims 1 and 3, in which the composition of the host phosphate glass is provided. Claim 29 recites the features generally found in claims 17 and 3.

For the reasons provided to traverse the rejections to independent claims 1, 14 and 17 and for the additional features they recite, the rejections of the dependent claims are traversed. Applicant reserves the right to address the specific rejections raised by the Examiner if necessary and at the appropriate time to establish their patentability.

Therefore, independent claims 1, 14, 17, 24 and 29 from which claims 2-13, 15-16, 19-23, 25-28 and 30-32 depend, include limitations which are not shown or suggested in the cited references. Nor do the cited

references provide any motivation or incentive for modifying the respective teachings to achieve the claimed invention, or any basis for a reasonable expectation of success in modifying the teachings to achieve the claimed invention.

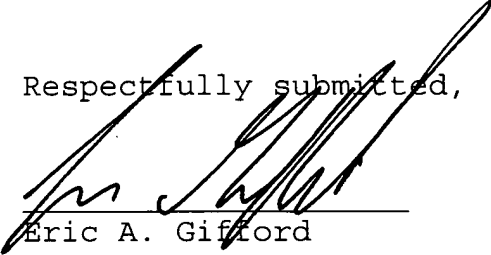
Therefore, the rejection of these claims under 35 U.S.C. § 103 has been overcome.

Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below listed telephone number if, in the opinion of the Examiner, such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,



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